Financial Portfolios.

- Loans
- Bonds

We have **deterministic** interest rates, so **RISKLESS** or **RISK-FREE**.

**RISKY ASSETS**

- **Commodities**: gold, silver, corn, rice, cacao, oil,...
- **Foreign currencies**: GBP, Yen, Euro,...
- **Shares of stock**

Prices which are **TIME-VARYING** and **NONDETERMINISTIC**.

For stocks: $S(t)$, $t \geq 0$ ... the asset price @ time $t$.

In particular: $S(0)$ ... initial asset price
- $S(T)$ ... final asset price.
Financial Instruments.

1. when the cashflows happen, what the cashflow amounts are. e.g., fixed cashflows @ fixed times, i.e., annuities.

Outright purchase of one share of stock

\[\text{Dividends} \quad \text{Assume fixed projected dividend schedule!}\]

Case #1. No dividends.

\[\frac{-S(0)}{O} \quad +\frac{S(T)}{T}\]

Case #2. Discrete dividends.

\[\frac{-S(0)}{O} \quad \frac{D_1}{t_1} \frac{D_2}{t_2} \ldots \frac{D_k}{t_k} \ldots \frac{D_n}{t_n} \quad +\frac{S(T)}{T}\]

Fixed dividend payment times.

\[\text{dividend payments:}\]

- Deterministic
- Per share
Case #3. Continuous dividends.

Recall: continuous annuities
- rate of payment $p(t), t \geq 0,$
  i.e., the amount paid during the time interval $(t, t+dt)$ is $p(t) \, dt$

$\delta \ldots$ (constant) dividend yield

The dividend amount paid to the shareholder during the time interval $(t, t+dt)$ is given to be $\delta \cdot S(t) \, dt$ per share owned.

EXAMPLE: Foreign currencies.